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Orthodontic Treatment Need in Asian Adult Males

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ABSTRACT

Orthodontic treatment in adults has gained social and professional acceptance in recent years. An assessment of orthodontic treatment need helps to identify individuals who will benefit from treatment and safeguard their interest. The purpose of this study was to assess the objective and subjective levels of orthodontic treatment need in a sample of orthodontically untreated adult Asian males. A sample of male army recruits (n = 339, age 17-22 years, Chinese = 258, Malay = 60, Indian = 21) with no history of orthodontic treatment or craniofacial anomalies participated in the study on a voluntary basis with informed consent. Impressions for study models were taken. Objective treatment need was assessed based on study model analysis using the Index of Orthodontic Treatment Need (IOTN). Questionnaires were used to assess subjective treatment need based on subjective esthetic component (EC) ratings. Fifty percentage of the sample had a definite need for orthodontic treatment (dental health component [DHC] grades 4 and 5), whereas 29.2% had a moderate need for treatment (DHC grades 3). The occlusal trait most commonly identified was dental crossbite. Malay males had the highest percentage with a definite need for treatment for both dental health and esthetic reasons in comparison with Chinese and Indian males. However, there was no difference in the level of treatment need among the ethnic groups ($P > .05$). No correlation between objective and subjective EC scores was found ($P > .05$). A high level of investigator-identified treatment need was not supported by a similar level of subject awareness among the adult sample.

KEY WORDS: Objective treatment need, Subjective treatment need, Index of Orthodontic Treatment Need, Adult males.

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The desire to improve dentofacial esthetics was the main motivation commonly expressed by orthodontic patients.¹⁻⁴ This was most evident especially in adults who seek orthognathic surgery.^{5,6} Previous studies on the perception of malocclusion found that adults were generally more aware of the arrangement of anterior occlusal traits than buccal segments. The anterior occlusal traits of major concern among adults were anterior crowding, rotations, and overjet.^{7,8} Men were generally more satisfied with their dental appearance and less likely to perceive a need for orthodontic treatment to correct their malocclusions than women.⁹ Stenvik et al¹⁰ found that dissatisfaction with dental appearance and desire for treatment decreased with increasing age. Older men did not view having straight teeth to be important when compared with women. The availability of orthodontic services has been shown to affect self-satisfaction of dental appearance and the desire for treatment in young adults.¹¹

Studies on orthodontic treatment need in adults found that up to a third had a moderate to high need for orthodontic treatment.^{4,10} A study on US male army recruits using the Treatment Priority Index found that 76.9% of the sample would benefit from treatment, with 16.3% having malocclusions that were severe or handicapping. Recruits with severe handicapping malocclusions were more likely to perceive a need for treatment.¹² Bergstrom et al¹³ found that young adults with minor occlusal irregularities expressed the importance of straight teeth, but adults from urban areas were less tolerable toward malocclusion than those from rural areas. However, there was no difference in the desire for treatment between adults from both areas.

Occlusal indices have been commonly used to objectively assess orthodontic treatment need.¹⁴⁻¹⁶ The Index of Orthodontic Treatment Need (IOTN) was developed to identify individuals who would benefit from orthodontic treatment.¹⁷ It comprises a dental health component (DHC) and an esthetic component (EC). DHC measures the worst occlusal trait that is potentially damaging to dental tissues. It has 5 grades ranging from 1 (no need for treatment) to 5 (very great need). The qualifier of the component in each grade indicates the occlusal trait that is measured. The EC measures the degree of dental attractiveness ranging from grade 1 (very attractive) to 10 (very unattractive) as an indication for treatment to improve the dental appearance. The IOTN has been shown to be valid and reliable.^{18,19}

The fact that malocclusion is not a disease and a patient's decision to undergo orthodontic treatment is elective and influenced by patient and care provider factors.²⁰ Therefore, there is a need to assess the prevailing orthodontic treatment need and demand balance within a community. It is important to determine the extent of this inequity so that high-treatment need individuals who missed the opportunity for treatment at an earlier age can be identified and advised accordingly. Thus, the assessment of treatment need in orthodontically untreated adults could serve as a retrospective indicator of treatment need inequity.

The aims of this study were to determine the level of objective and subjective orthodontic treatment need in orthodontically untreated Asian adult males and their self-perception of dental attractiveness.

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A sample of medically fit male army recruits (n = 339, age 17-22 years) with no history of orthodontic treatment, serial extraction, or craniofacial anomalies participated in this research on a voluntary basis with informed consent. The ethnic distribution of the sample was Chinese (n = 258), Malay (n = 60), and Indian (n = 21). Impressions were taken from all participants for study model fabrication. The participants were asked to rank their own dental attractiveness according to the EC scale of the IOTN. Questionnaires were used to

determine the perceived benefits of orthodontic treatment by the participants and their desire for orthodontic treatment in future. All questionnaires were completed for completeness and collected by one investigator at the same session as impression taking. Objective treatment need was assessed by a single examiner who was trained in the use of the IOTN. Study model analysis was performed in accordance to the following protocol:

- Incompetent lips were assumed when an overjet of 3.5–6.0 mm was present.
- A discrepancy of greater than two mm between retruded contact point and intercuspal position was assumed when crossbites were present and a DHC grade 4c was awarded.
- Masticatory and speech problems were assumed to be present when reverse overjet was present.

Study models with retained primary teeth and no clinical evidence of permanent successors were scored as grade 4 or 5h. Duplicate determination was performed six weeks after the initial scoring on 30 randomly selected study models.

Statistical analysis

Data analysis was performed using SPSS 11.0 (SPSS Inc, Chicago, Ill). Kappa statistics were used to determine intraexaminer reproducibility of objective DHC and EC assessment. Treatment need among ethnic groups was analyzed using chi-square test. Spearman rank correlation analysis was used to assess objective EC and subjective EC scores. Statistical significance was set at $P < .05$ for all analyses.

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Intraexaminer reproducibility

The weighted Kappa agreement scores for DHC and EC was 0.96 and 0.82, respectively, which indicated good intraexaminer reproducibility.

Dental health component

The distribution of DHC grades and qualifiers of the total sample is shown in [Table 1](#). Dental crossbites and displacements were the most commonly encountered occlusal traits in the sample. [Figure 1](#) shows the distribution of DHC scores, with 50.1% of the sample with a definite need for orthodontic treatment (grades 4 and 5), 29.2% with borderline need (grade 3), and 20.7% not requiring treatment (grade 2).

Esthetic component

The distribution of objective EC scores is shown in [Figure 2](#). Dental attractiveness with EC grade 3 had the highest percentage. Definite treatment to improve dental esthetics was found in 29.2% of the sample (EC grades 8, 9, and 10). Borderline need for treatment was found in 28.1% (EC grades 5, 6, and 7), whereas 42.7% did not need treatment to improve the dental appearance.

Treatment need among ethnic groups

The Malay ethnic group had the highest proportion with definite treatment need based on both DHC (grades 4 and 5) and EC (grades 8–10) when compared with Chinese and Indian groups as shown in [Table 2](#). However, the difference in the level of objective treatment need among the ethnic groups was nonsignificant ($P > .05$). A higher proportion of subjects had definite objective treatment need based on dental health rather than on dental esthetic reasons within each ethnic group.

Perceived esthetics and desire for and perceived benefits of orthodontic treatment

Only 18.9% of the total sample perceived themselves to have good dental appearance, whereas 36.6% perceived otherwise, and 44.5% were indecisive as shown in [Table 3](#). Slightly more than two-thirds did not consider the need for treatment, whereas only 8.8% thought that they would need treatment. The majority perceived the benefits of orthodontic treatment to be related to the improvement of dental esthetics (76.7%) rather than masticatory and speech function (33.9%).

Objective vs subjective EC assessment

[Table 4](#) shows the distribution of objective and subjective EC scores. The adult males tend to score themselves on the lower end of the EC scale as compared with objective assessment. There was no correlation between objective and subjective EC scores ($P > .05$).

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The results indicated that half the total sample had malocclusions that would require definite orthodontic treatment for dental health reasons (DHC grades 4 and 5). The level of definite objective treatment need in Asian male army recruits was lower as compared with US army recruits.¹² However, this comparison could only serve as a guide because a different index was used in that study. Dental crossbites accounted for a high proportion of the Asian males with a definite need for treatment. However, this figure might be slightly elevated as a result of the application of study model protocol for DHC assessment, which assumed all crossbites to be associated with more than two mm of functional shift of the mandible. Almost half of each ethnic subsample had definite treatment need based on dental health reasons. Definite treatment need for esthetic impairment accounted not more than one-third of each ethnic group. There was no significant difference in the level of treatment need among the ethnic groups, although Malay subsample had the greatest proportion of adults with definite treatment need ([Table 2](#)).

Twenty-six of the subjects (7.7%) had malocclusions with DHC grades 4a and 5a, which meant that they had overjet greater than six mm. Some of these adults could have been potential candidates for functional therapy in their growing years. Studies on incisor trauma reported that males were more prone than females, and the risk increased with increasing age up to a plateau at about 24 years of age.^{21,22} As such, these individuals could be predisposed to a higher risk of incisor trauma during combat military training. The use of mouth guards during peacetime military training would be appropriate. A small percentage of adults (1.8%) with definite treatment need had reverse overjet of one mm or more (DHC 4m and 5m). It could be inferred that some of these adults would require surgical-orthodontic management to address their treatment need.

Subjects with DHC grade 4h or 5h were assumed to have missing teeth. However, there was a possibility that some of these adults might have impacted permanent successors. This meant that some of the subjects with DHC grade 4h or 5h could have been in the DHC 5i category instead. This could only be confirmed from radiographs that were not within the ethical scope of the study. Nevertheless, subjects with 4h, 5h, and 5i category would still be in the high-treatment need category. A very small percentage had DHC grade 4t (1.2%), which implied that there was a potential for caries and periodontal problems to develop in future at those sites with tipped and partially impacted permanent teeth.

Twenty-nine percentage of the sample had malocclusions (objective EC scores 8–10) that needed treatment from an esthetic viewpoint ([Figure 2](#)). This finding revealed that the justification for orthodontic treatment in these adults based on esthetic reason was less warranted than dental health reasons. This disparity could be attributed to the fact that subjects with posterior buccal or lingual crossbites had acceptable dental esthetics. There was no significant correlation ($r = 0.027$, $P > .05$) between subjective and objective EC scores ([Table 4](#)). Thus, the subjects perceived dental esthetics differently from that of the principle investigator. A high proportion of the adult males (92.3%) ranked themselves in the highly attractive end of the EC scale of grade 4 or less. However, this was not reflected in the questionnaire responses, with only 18.9% perceived themselves to have "a nice looking set of

teeth" (Table 3). Perhaps, the subjects were different because of their dentition as reported in the literature that men generally did not express much dental esthetic concern.⁹ Recent studies have shown that self-satisfaction with one's own dental appearance and cost of treatment were the two major factors that discouraged individuals from seeking treatment despite the definite need.^{23,24} Only 8.8% of the study sample expressed a need for orthodontic treatment.

Although the results of this study could not be directly applied to the community at large, it did provide sufficient information to justify the need for future studies on orthodontic treatment need in adults to be conducted within the population. The high level of definite objective treatment need based on dental health issues despite the readily available orthodontic care within the community from which the sample was derived warrants further assessment and evaluation of the provision and utilization of orthodontic care in the community.

CONCLUSIONS [Return to TOC](#)

A high level of definite objective orthodontic treatment need was found in young Asian adult males. This need was not matched by a similar level of demand for treatment. Dental crossbite was the most common occlusal trait that had contributed to the moderately high level of orthodontic treatment need. There was no difference in the level of orthodontic treatment need among the ethnic groups. There was no significant correlation between objective and subjective assessment of treatment need based on dental esthetics. Objective assessment showed that the justification for orthodontic treatment based on dental health reasons was more evident than esthetic impairment. Future population studies on orthodontic treatment need in adults for both genders are highly recommended.

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REFERENCES [Return to TOC](#)

1. Shaw WC. Factors influencing the desire for orthodontic treatment. *Eur J Orthod.* 1981; 3:151–162. [[PubMed Citation](#)]
2. Tuominen ML, Tuominen RJ, Nyström M. Subjective orthodontic treatment need and perceived dental appearance among young Finnish adults with and without previous orthodontic treatment. *Comm Dent Health.* 1994; 11:29–33. [[PubMed Citation](#)]
3. Lew KK. Attitudes and perceptions of adults towards orthodontic treatment in an Asian community. *Comm Dent Oral Epidemiol.* 1993; 21:31–35. [[PubMed Citation](#)]
4. Salonen L, Mohlin B, Götzlinger B, Helldén L. Need and demand for orthodontic treatment in an adult Swedish population. *Eur J Orthod.* 1992; 14:359–368. [[PubMed Citation](#)]
5. McKiernan EXF, McKiernan F, Jones ML. Psychological profiles and motives of adults seeking orthodontic treatment. *Int J Adult Orthod Orthognath Surg.* 1992; 7:187–198. [[PubMed Citation](#)]
6. Rivera SM, Hatch JP, Dolce C, Bays RA, Van Sickels JE, Rugh JD. Patients' own reasons and patient-perceived recommendations for orthognathic surgery. *Am J Orthod Dentofacial Orthop.* 2000; 118:134–140. [[PubMed Citation](#)]
7. Helm S, Petersen PE, Kreiborg S, Solow B. Effect of separate malocclusion traits on concern for dental appearance. *Commun Dent Oral Epidemiol.* 1986; 14:217–220. [[PubMed Citation](#)]
8. Espeland LV, Stenvik A. Perception of personal dental appearance in young adults: relationship between occlusion, awareness, and satisfaction. *Am J Orthod Dentofacial Orthop.* 1991; 100:234–241. [[PubMed Citation](#)]
9. Tuominen ML, Tuominen RJ, Nystrom ME. Subjective orthodontic treatment need and perceived dental appearance among young Finnish adults with and without previous orthodontic treatment. *Commun Dent Health.* 1994; 11:29–33. [[PubMed Citation](#)]
10. Stenvik A, Espeland L, Berset GP, Eriksen HM. Attitudes to malocclusion among 18- and 35-year-old Norwegians. *Community Dent Oral Epidemiol.* 1996; 24:390–393. [[PubMed Citation](#)]
11. Espeland L, Stenvik A. Residual need in orthodontically untreated 16–20-year-olds from areas with different treatment rates. *Eur J Orthod.* 1999; 21:523–531. [[PubMed Citation](#)]
12. Searcy VL, Chisick MC. Perceived, desired, and normatively determined orthodontic treatment needs in male US Army recruits. *Community Dent Oral Epidemiol.* 1994; 22:437–440. [[PubMed Citation](#)]
13. Bergstrom K, Halling A, Huggare J. Orthodontic treatment demand—differences between urban and rural areas. *Community Dent Health.* 1998; 15:272–276. [[PubMed Citation](#)]
14. Shaw WC, Richmond S, O'Brien KD. The use of occlusal indices: a European perspective. *Am J Orthod Dentofacial Orthop.* 1995; 107:1–10. [[PubMed Citation](#)]
15. Tang EL, Wei SH. Recording and measuring malocclusion: a review of the literature. *Am J Orthod Dentofacial Orthop.* 1993; 103:344–351. [[PubMed Citation](#)]
16. O'Brien KD, Shaw WC, Roberts CT. The use of occlusal indices in assessing the provision of orthodontic treatment by the hospital orthodontic service of England and Wales. *Br J Orthod.* 1993; 20:25–35. [[PubMed Citation](#)]
17. Brook PH, Shaw WC. The development of an index of orthodontic treatment priority. *Eur J Orthod.* 1989; 11:309–320. [[PubMed Citation](#)]
18. Cooper S, Mandall NA, DiBiase D, Shaw WC. The reliability of the index of orthodontic treatment need over time. *J Orthod.* 2000; 27:47–53.
19. Younis JW, Vig KW, Rinchuse DJ, Weyant RJ. A validation study of three indexes of orthodontic treatment need in the United States. *Community Dent Oral Epidemiol.* 1997; 25:358–362. [[PubMed Citation](#)]
20. Shaw WC, O'Brien KD, Richmond S, Brook P. Quality control in orthodontics: factors influencing the receipt of orthodontic treatment. *Br Dent J.* 1991; 70:66–68.
21. Kaste LM, Gift HC, Bhat M, Swango PA. Prevalence of incisor trauma in persons 6–50 years of age: United States, 1988–1991. *J Dent Res.* 1996; 75:696–705. [[PubMed Citation](#)]
22. Holland TJ, O'Mullane DM, Whelton HP. Accidental damage to incisors amongst Irish adults. *Endod Dent Traumatol.* 1994; 10:191–194. [[PubMed Citation](#)]
23. Soh J, Sandham A. Factors influencing orthodontic treatment uptake. *Singapore Dent J.* 2003; 25:1–4.
24. Kerosuo H, Abdulkarim E, Kerosuo E. Subjective need and orthodontic treatment experience in a Middle East country providing free orthodontic services: a questionnaire survey. *Angle Orthod.* 2002; 72:565–570. [[PubMed Citation](#)]

TABLE 1. Distribution of DHC Scores and Qualifiers of Sample, n = 339^a

DHC Scores		Frequency	Percentage
Grade	Qualifier ^b		
2	d	64	18.9
	g	6	1.8
Total		70	20.7
3	a	42	12.4
	d	56	16.5
	e	1	0.3
Total		99	29.2
4	a	19	5.6
	c	90	26.5
	d	18	5.3
	h	19	5.6
	m	3	0.9
	t	4	1.2
Total		153	45.1
5	a	7	2.1
	h	7	2.1
	m	3	0.9
Total		17	5.0

^a DHC indicates dental health component.

^b Qualifier identifies the worst occlusal trait within each grade of treatment need.

TABLE 2. Distribution of Objective DHC (%) and EC (%) Scores Among Ethnic Groups^a

Ethnic Group	Sample Size	DHC*			EC**		
		No Need	Borderline Need	Definite Need	No Need	Borderline Need	Definite Need
Chinese	258	21.3	29.1	49.6	43.8	28.0	28.2
Malay	60	18.3	28.3	53.3	38.3	26.7	35.0
Indian	21	19.0	33.3	47.6	42.9	33.4	23.7

^a DHC indicates dental health component; EC, esthetic component.

* $\chi^2 = 0.053$, df = 4, $P > .05$; ** $\chi^2 = 1.56$, df = 4, $P > .05$.

TABLE 3. Perceived Dental Esthetics and Treatment Need; Perceived Benefits of Treatment

	% Response		
	Yes	No	Not Sure
Perceived dental esthetics and desire for orthodontic treatment			
Do you think you have a nice looking set of teeth?	18.9	36.6	44.5
Do you think you need to wear braces?	8.8	68.1	23.0
Perceived benefits of treatment			
What do think are the benefits of orthodontic treatment?	% Response		
To have a nice looking set of teeth when I smile	76.7		
To be able to chew and eat better	17.1		
To be able to talk better	16.8		
Not sure	9.1		

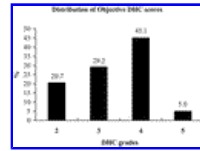
TABLE 4. Objective vs Subjective EC Scores^{a*}

Subjective EC Grades	Objective EC Grades										Total
	1	2	3	4	5	6	7	8	9	10	
1		10	24	7		12	16	12	7	8	96
2	1	7	27	6	2	13	13	18	3	4	94
3		7	29	6	2	12	8	13	8	8	93
4		4	6	6		4	3	5	1	1	30
5			1			2		2			5
6			1			1			1		3
7						1	3	1	1		6
8			1			2		4		1	8
9				1	1			1			3
10			1								1
Total	1	28	90	26	5	47	43	56	21	22	339

^a EC indicates esthetic component.

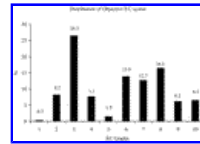
* $r_s = 0.027$, $df = 8$, $P > .05$.

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Click on thumbnail for full-sized image.

FIGURE 1. Distribution of objective dental health component scores of sample, n = 339



Click on thumbnail for full-sized image.

FIGURE 2. Distribution of objective esthetic component scores of sample, n = 339

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